REMARKS/ARGUMENTS

Claims 1 and 3-13 are pending in this application. By this Amendment, the drawings and claims 1 and 3 -13 are amended, and claim 2 is canceled without prejudice or disclaimer. Support for the claims can be found throughout the specification, including the original claims and the drawings. Withdrawal of the rejections in view of the above amendments and the following remarks is respectfully requested.

I. Informalities

The Office Action objects to the drawings due to informalities. It is respectfully submitted that the amendments to the drawings submitted herewith are responsive to the Examiner's comments, and thus the objection should be withdrawn.

II. Rejection Under 35 U.S.C. §102(a)

The Office Action rejects claims 1, 4 and 5 under 35 U.S.C. §102(a) over Hwang et al., U.S. Patent Publication No. 2002/0062652 (hereinafter "Hwang"). The rejection is respectfully traversed.

Independent claim 1 is directed to a driving control method for a linear compressor. The method includes determining when the compressor is compression processing and suction processing based on a maximum value of a current and a phase angle variance, and applying an appropriate firing angle during compression processing and during suction processing, respectively, based on a detected load state. Hwang neither discloses nor suggests such features, or the claimed combination of features.

Independent claim 1 has been amended to include the features of claim 2. The Office Action combines Hwang with Yoo et al., U.S. Patent Publication No. 2002/0090304 (hereinafter "Yoo") in a rejection of claim 2. Thus, this rejection will be discussed with respect to Hwang and Yoo.

Hwang discloses a system for controlling a linear compressor 120, including a current detecting unit 200, a work operation unit 300, and a microcomputer 700 including a suction/discharge pressure difference storing unit 600. The microcomputer 700 controls the linear compressor 120 via an electric circuit unit 100 including a power voltage unit 110, a resistor R2, a triac Tr2, and a capacitor C2. When a user sets a desired temperature in a refrigerator in which the compressor 120 is installed, a stroke input value (corresponding to the desired set temperature) is input to the microcomputer 700 (S100). The microcomputer 700 outputs a corresponding switching value to the triac Tr2, which is then turned on to apply voltage to the compressor 120, and the velocity and stoke distance of the piston of the compressor 120 is controlled based on the magnitude of the applied voltage to achieve the desired set temperature (S110).

As the compressor 120 operates, the current detecting unit 200 detects an applied current and outputs it to the work operation unit 300 (S120). The work operation unit 300 integrates this input over one cycle and outputs a work operation signal to the microcomputer (S130). The microcomputer 700 determines a suction/discharge pressure difference (from the storing unit 600) corresponding to the work operation signal, and generates a corresponding load on the

compressor 120 (S140). In an overload situation, the microcomputer 700 optimizes the duty ratio to enlarge and maintain a stroke (S180). In the event of no overload, present and previous work operation signals are compared (S170). If the present signal is greater than the previous signal, the duty ratio is increased (S150). If the present signal is less than the previous signal, the duty ratio is maintained (S200). Hwang neither discloses nor suggests that an appropriate firing angle is applied during compression processing and suction processing based on a maximum current value and phase angle variance and a detected load state.

In Hwang's method, operation of the compressor 120 is controlled by varying or maintaining a duty ratio based on a suction/discharge pressure difference. Hwang neither discloses nor suggests any means by which the system determines when the compressor 120 is in a compression processing mode versus a suction processing mode, let alone that such a determination is made based on a maximum value of a current and a phase angle variance, as recited in independent claim 1.

Yoo fails to overcome the deficiencies of Hwang. Yoo discloses a system for controlling a reciprocating compressor 24, including a stroke value determining unit 21, a stroke controller 23, a stroke calculating unit 25, and a voltage and current detecting unit 26. A max stroke value Max ST (power input at maximum load on the motor) is set and stored (S31), a stroke reference value Ref ST is set and stored (S32), and first and second stroke limit values lim ST_1 and lim ST_2 are set and stored based on the Max ST and Ref ST values (S33, S34). During operation, an actual stroke value is compared to the lim ST_1, lim ST_2, and Ref ST values (S35, S37, S38,

respectively), and the current to the compressor 24 is increased or decreased accordingly (S36, S39). A calculated stroke value Cal ST is calculated based on the input current and voltage, the Cal ST is compared to the Ref ST value (S41), and the actual stroke value is increased or decreased accordingly (S40, S42).

Yoo suffers deficiencies similar to those set forth above with respect to Hwang. That is, Yoo neither discloses nor suggests that an appropriate firing angle is applied during compression processing and suction processing based on a maximum current value and phase angle variance and a detected load state. In Yoo's method, operation of the compressor 24 is controlled by either increasing or decreasing a stroke value based on a comparison of actual versus reference and limiting stroke values. This determination and subsequent increases/decreases in stroke value are conducted regardless of whether or not the compressor 24 is performing in a compression or a suction mode. Yoo neither discloses nor suggests any means by which the system determines when the compressor is in a compression processing mode versus a suction processing mode, let alone that such a determination is made based on a maximum value of a current and a phase angle variance, as recited in independent claim 1.

Accordingly, it is respectfully submitted that independent claim 1 is allowable over Hwang and Yoo, either alone or in combination, and thus the rejection of independent claim 1 should be withdrawn. Dependent claims 4 and 5 are allowable over Hwang and Yoo at least for the reasons set forth above with respect to independent claim 1, from which they depend, as well as for their added features.

III. Rejection Under 35 U.S.C. §103(a)

The Office Action rejects claims 2, 3 and 6-13 under 35 U.S.C. §103(a) over Hwang in view of Yoo. Claim 2 has been cancelled. The rejection, in so far as it applies to claims 3 and 6-13, is respectfully traversed.

Independent claim 7 is directed to a driving control method for a linear compressor. The method includes detecting a voltage and a current generated at a linear compressor, determining a present voltage/current phase difference based on the detected voltage and current, comparing the present voltage/current phase difference with a standard voltage/current phase difference, and performing variable capacity stroke control and varying a stroke when the present voltage/current phase difference is greater than the standard voltage/current phase difference, and decreasing a stroke when the present voltage/current phase difference is less than the standard voltage/current phase difference.

Independent claim 9 is directed to a driving control apparatus of a linear compressor. The apparatus includes an electric circuit that drives a linear compressor by varying a stroke and a corresponding piston movement, a voltage/current detector that detects a voltage and a current generated by the electric circuit, a phase difference detector that receives a voltage and a current from the voltage/current detector and detects a voltage/current phase difference at a corresponding point in time, and a stroke controller that receives a phase difference from the phase difference detector and applies a stroke voltage to the electric circuit based on the received phase difference, wherein the stroke controller applies a different firing angle during

compression processing than that applied during suction processing based on the received phase difference. As acknowledged in the Office Action and as set forth above, Hwang neither discloses nor suggests the features of independent claims 7 and 9, or the respective claimed combinations of features. Further, as set forth above, Yoo fails to overcome the deficiencies of Hwang.

Accordingly, it is respectfully submitted that independent claims 7 and 9 are allowable over the applied combination, and thus the rejection of independent claims 7 and 9 under 35 U.S.C. §103(a) over Hwang and Yoo should be withdrawn. Dependent claims 8 and 10-13 are allowable over Hwang and Yoo at least for the reasons set forth above with respect to independent claims 7 and 9, from which they respectively depend, as well as for their added features.

Likewise, dependent claims 3 and 6 are allowable over Hwang at least for the reasons set forth above with respect to independent claim 1, from which they depend, as well as for their added features. Further, as set forth above, Yoo fails to overcome the deficiencies of Hwang. Accordingly, it is respectfully submitted that claims 3 and 6 are allowable over the applied combination, and thus the rejection of claims 3 and 6 under 35 U.S.C. §103(a) over Hwang and Yoo should be withdrawn.

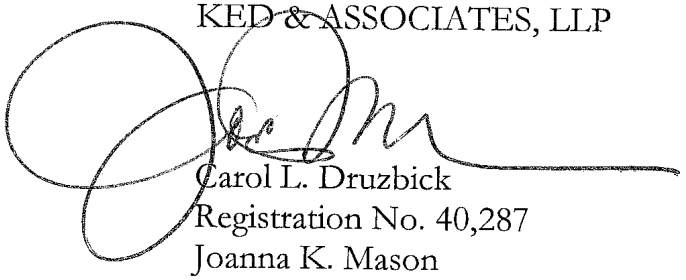
IV. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes

would place the application in better condition for allowance, the Examiner is invited to contact the undersigned, **Joanna K. Mason**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP



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